

The Journal of

Membrane Biology

An international journal

**for studies on the structure, function and genesis
of biomembranes**

Volume 114 1990

Editorial Board

W.R. Loewenstein, Miami, Editor-in-Chief

Q. Al-Awqati, Columbia

G. Blobel, Rockefeller

D. Branton, Harvard

P. Cuatrecasas, Warner Lambert

J.M. Diamond, California, L.A.

D. Engelman, Yale

S. Fleischer, Vanderbilt

J.G. Forte, California, Berkeley

G. Guidotti, Harvard

J. Handler, Johns Hopkins

A. Helenius, Yale

L. Heppel, Cornell

W.L. Hubbell, California, L.A.

R.B. Kelly, California, S.F.

A. Klug, Cambridge

P. Läuger, Konstanz

S.E. Luria, MIT

E.A.C. MacRobbie, Cambridge

V.T. Marchesi, Yale

H.M. McConnell, Stanford

S. McLaughlin, SUNY, Stony Brook

C. Miller, Brandeis

H. Murer, Zurich

G.E. Palade, Yale

E. Racker, Cornell

H. Reuter, Bern

B. Sakmann, Max-Planck, Heidelberg

R.W. Schekman, California, Berkeley

S.G. Schultz, Texas

S.J. Singer, California, S.D.

C.L. Slayman, Yale

K.R. Spring, N.I.H.

C.F. Stevens, Salk Institute

W. Stoeckenius, California, S.F.

D. Urry, Alabama

H.H. Ussing, Copenhagen

D.J. Fritts, Assistant to the Editor



Springer International

The exclusive copyright for all languages and countries, including the right for photomechanical and any other reproductions, also in microform, is transferred to the publisher

The use of registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Printed in West Germany

© 1990 by Springer-Verlag New York Inc.

Springer International



Author Index

- Akabas, M., Dodd, J., Al-Awqati, Q.: Identification of Electrophysiologically Distinct Subpopulations of Rat Taste Cells 71
- Al-Awqati, Q., *see* Akabas, M., et al. 71
- Anraku, Y., *see* Yamato, I. 143
- Armstrong, S.K., *see* Bullock, J.O., et al. 79
- Arnold, K., *see* Ohki, S. 195
- Bamberg, E., *see* Hijden, H.T.W.M. van der, et al. 245
- Beilby, M.J., *see* Blatt, M.R., et al. 205
- Blatt, M.R., Beilby, M.J., Tester, M.: Voltage Dependence of the *Chara* Proton Pump Revealed by Current-Voltage Measurement During Rapid Metabolic Blockade with Cyanide 205
- Bosma, M.M., Moody, W.J.: Macroscopic and Single-Channel Studies of Two Ca^{2+} Channel Types in Oocytes of the Ascidian *Ciona intestinalis* 231
- Bullock, J.O., Armstrong, S.K., Shear, J.L., Lies, D.P., McIntosh, M.A.: Formation of Ion Channels by Colicin B in Planar Lipid Bilayers 79
- Cook, D.I., Poronnik, P., Young, J.A.: Characterization of a 25-pS Nonselective Cation Channel in a Cultured Secretory Epithelial Cell Line 37
- Cooper, K., *see* Rae, J.L., et al. 29
- Dewey, J., *see* Rae, J.L., et al. 29
- Dodd, J., *see* Akabas, M., et al. 71
- Dunne, M.J., Yule, D.I., Gallacher, D.V., Petersen, O.H.: Comparative Study of the Effects of Cromakalim (BRL 34915) and Diazoxide on Membrane Potential, $[\text{Ca}^{2+}]_i$ and ATP-Sensitive Potassium Currents in Insulin-Secreting Cells 53
- Fermini, B., Nathan, R.D.: Sialic Acid and the Surface Charge Associated with Hyperpolarization-Activated, Inward Rectifying Channels 61
- Fritzsch, G., *see* Koepsell, H., et al. 113
- Gallacher, D.V., *see* Dunne, M.J., et al. 53
- Gates, P., *see* Rae, J.L., et al. 29
- Ghishan, F.K., *see* Kikuchi, K., et al. 257
- Grell, E., *see* Hijden, H.T.W.M. van der, et al. 245
- Hijden, H.T.W.M. van der, Grell, E., Pont, J.J.H.H.M. De, Bamberg, E.: Demonstration of the Electrogenicity of Proton Translocation During the Phosphorylation Step in Gastric $\text{H}^+ \text{K}^+$ -ATPase 245
- Hoffmann, E.K., *see* Livne, A. 153
- Kasai, M., Muto, S.: Ca^{2+} Pump and $\text{Ca}^{2+}/\text{H}^+$ Antiporter in Plasma Membrane Vesicles Isolated by Aqueous Two-Phase Partitioning from Corn Leaves 133
- Kikuchi, K., Kikuchi, T., Ghishan, F.K.: Ontogeny of the Na^+/H^+ Exchanger in Rat Ileal Brush-Border Membrane Vesicles 257
- Kikuchi, T., *see* Kikuchi, K., et al. 257
- Kimmich, G.A.: Membrane Potentials and the Mechanism of Intestinal Na^+ -Dependent Sugar Transport (*topical review*) 1
- Koepsell, H., Fritzsch, G., Korn, K., Madrala, A.: Two Substrate Sites in the Renal Na^+/D -Glucose Cotransporter Studied by Model Analysis of Phlorizin Binding and D-Glucose Transport Measurements 113
- Korn, K., *see* Koepsell, H., et al. 113
- Lies, D.P., *see* Bullock, J.O., et al. 79
- Livne, A., Hoffmann, E.K.: Cytoplasmic Acidification and Activation of Na^+/H^+ Exchange During Regulatory Volume Decrease in Ehrlich Ascites Tumor Cells 153
- Madrala, A., *see* Koepsell, H., et al. 113
- Mahmoud, A.A., *see* Sjodin, R.A., et al. 225
- McCann, F.V., McCarthy, D.C., Noelle, R.J.: Patch-Clamp Profile of Ion Channels in Resting Murine B Lymphocytes 175
- McCarthy, D.C., *see* McCann, F.V., et al. 175
- McIntosh, M.A., *see* Bullock, J.O., et al. 79
- Montes, J.G., *see* Sjodin, R.A., et al. 225
- Moody, W.J., *see* Bosma, M.M. 231
- Muto, S., *see* Kasai, M. 133
- Nathan, R.D., *see* Fermini, B. 61
- Noelle, R.J., *see* McCann, F.V., et al. 175
- Ohkawa, T.-A., Tsutsui, I.: Electrical Tolerance (Breakdown) of the *Chara corallina* Plasmalemma: II. Inductive Property of Membrane and Effects of pH_o and Impermeable Monovalent Cations on Breakdown Phenomenon 159
- Ohki, S., Arnold, K.: Surface Dielectric Constant, Surface Hydrophobicity and Membrane Fusion 195
- Okazaki, Y., Tazawa, M.: Calcium Ion and Turgor Regulation in Plant Cells (*topical review*) 189
- Petersen, O.H., *see* Dunne, M.J., et al. 53
- Pont, J.J.H.H.M. De, *see* Hijden, H.T.W.M. van der, et al. 245
- Poronnik, P., *see* Cook, D.I., et al. 37
- Rae, J.L., Dewey, J., Cooper, K., Gates, P.: Potassium Channel in Rabbit Corneal Endothelium Activated by External Anions 29
- Shear, J.L., *see* Bullock, J.O., et al. 79
- Sjodin, R.A., Mahmoud, A.A., Montes, J.G.: Direct Inhibitory Action of EGTA- Ca Complex on Reverse-Mode Na/Ca Exchange in *Myxicola* Giant Axons 225
- Skulachev, V.P.: Power Transmission along Biological Membranes (*topical review*) 97
- Tazawa, M., *see* Okazaki, Y. 189
- Tester, M., *see* Blatt, M.R., et al. 205
- Tsutsui, I., *see* Ohkawa, T.-A. 159
- Yamato, I., Anraku, Y.: Mechanism of $\text{Na}^+/\text{Proline}$ Symport in *Escherichia coli*: Reappraisal of the Effect of Cation Binding to the $\text{Na}^+/\text{Proline}$ Symport Carrier 143
- Young, J.A., *see* Cook, D.I., et al. 37
- Yule, D.I., *see* Dunne, M.J., et al. 53

Covered in *Current Contents*, *SCI*, *ASCA* and *ISI/BIOMED*

Instructions to Authors

General

1. Authors should submit **four complete copies** (the original and three copies) to the Editor-in-Chief of **The Journal of Membrane Biology**. The original illustration material (original drawings, etc.) and three sets of copies should be submitted together with the manuscript. It is recommended that the authors suggest four to six names, including addresses and specific fields of interest, of possible referees for their paper.

2. Papers will be published in **English**. Because of the interdisciplinary nature of the journal, authors should strive to **avoid technical jargon** and to define specialized terminology.

3. Papers which are ready to go to the printers can be published within a **short period**.

Preparation of Manuscripts

4. Papers should be **typewritten**, double-spaced on one side of letter size paper preferably not larger than $8\frac{1}{2}'' \times 11\frac{3}{4}''$ and with a margin 2'' wide on the left. All pages should be numbered serially. References, Tables, footnotes and legends for illustrations should be typed (double-spaced) on separate pages. Manuscripts typed with a dot-matrix printer are not acceptable.

5. The **first page** should contain:

- a) the title
- b) the name(s) of the author(s)
- c) the name of the laboratory where the work was carried out
- d) a running title of not more than 40 characters including spaces
- e) footnotes to the title.

6. Papers should be preceded by a **summary** of not more than 225 words. The summary should be intelligible to the general reader without reference to the text. Abbreviations should be avoided in the summary.

7. The summary should be followed by about **6 key words** that will identify the subjects under which the article can be indexed.

8. The **bibliography** must refer only to work cited in the text. References must be listed alphabetically at the end of the paper including full titles and with abbreviations according to the Bibliographic Guide for Editors & Authors.

Eigen, G.S. 1960. The kinetics of cation transport. *Proc. R. Soc. London* **138**:182-191

Gibbs, T., Charles, R.T. 1961. Enzymes in membranes. In: *The Molecular Structure of Membranes*. B.A. Selkirk, editor. pp. 53-60. Springer-Verlag, New York

Inclusive pagination, stating first and last page numbers of articles, must be used.

Citations in the text should be given in parentheses; e.g., (Huntley & Briarly, 1967), or (Carson, 1940; Hopkins, 1943), except when the author's name is part of a sentence; e.g., "Harding (1968) reported that . . .". When a paper with three authors is cited, all authors are named in the first citation, but subsequently only the first author is named; e.g., (Miller et al., 1963). When a paper with *more* than three authors is cited, only the first author is named; e.g., (Smith et al., 1987). Another form of citation uses numbers in square brackets referring to an alphabetically ordered bibliography list. Either form is acceptable when used consistently throughout the paper.

9. **Footnotes** should be kept to a minimum and numbered consecutively throughout the paper. Footnotes to the title or authors of

the article are to be marked by asterisks and to be placed on the title page. Footnotes to formulae are to be marked by asterisks, too.

10. **Figures** must be separated from the text and numbered. Original drawings and graphs should be made in India ink on white bristol board. Clean glossy prints of these, shot in sharp focus to final size (50%) are preferred. Figures should be prepared to fit one column (8.1 cm) or, on rare occasions, two columns (16.9 cm), after a reduction to 50%. Lettering, thickness of lines, size of inscriptions, size of measuring points, adequate spacing of shaded and dotted areas should be large enough so as to be legible after reduction. Final size of letters should be: 2 mm for capital letters and numbers; 1.6 mm for lower case letters. If the size of the lettering is inadequate for reduction to 50%, figures will be returned to the authors, causing considerable delay.

The publisher reserves the right to reduce or enlarge illustrations.

Illustrations requiring reproduction as half-tone plates should be kept to a minimum. Photographs should be clean glossy prints in sharp focus and as rich in contrast as possible. They should be trimmed at precise right angles. Scales should be given.

11. Typewritten **mathematical equations** should be styled so as to avoid misinterpretation by the printer.

All letters contained in formulae as well as single letters in the text are automatically set in italics and therefore require no underlining. Hence, abbreviations that appear in formulae and are to be set in Roman type (the type normally used for the text) should be specially marked by underlining in yellow, if possible.

It will be helpful to the printer if **Greek characters are underlined in red and Script in green**. Small letters should then be underlined once and capital letters twice; this applies also to Latin letters in formulae (in pencil). Boldface type (heavy type) should be marked by wavy underlining.

Subscripts and superscripts should be clarified by caret and inverted caret marking 1_2^1 , 1_2^2 ; a subscript to a subscript, by 1_{23}^1 .

Obscure primes and dots must be called to the attention of the printer. Mark very clearly: number 1 and letter *l*; zero and letter, *O*, *o*; *e* and *c*; *e* and *l*; *n*, *u* and *v*; primes and apostrophes. Use fractional exponents instead of root signs and the solidus (/) for fractions wherever their use will save vertical space, exp () notation when the exponent is complicated.

All equations must be numbered sequentially in arabic numerals in parentheses on the right hand side of the page.

12. **Symbols and abbreviations** for units of measurements should follow the CBE Style Manual (5th ed. rev.) (Council of Biology Editors, Inc., 9650 Rockville Pike, Bethesda, MD 20814).

Copyright

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; that the manuscript will not be published elsewhere in any language without the consent of the copyright holders; that written permission of the copyright holder is obtained by the authors for material used from other copyrighted sources; and that any costs associated with obtaining this permission are the authors' responsibility.

The Most Current Research Advances in Your Field

Titles on Infectious Disease and Microbiology for the lab, classroom or clinical practitioner

An essential new reference . . .

A. Balows W.J. Hausler, Jr. E.H. Lennette

Laboratory Diagnosis of Infectious Diseases Principles and Practice

Volume 1: Bacterial, Mycotic, and Parasitic Diseases

Edited by A. Balows, Ph.D.; W.J. Hausler, Jr., Ph.D.; M. Ohashi, M.D.; and A. Turano, M.D.

Volume 2: Viral, Rickettsial, and Chlamydial Diseases

Edited by E.H. Lennette, M.D.; P. Halonen, M.D.; and F.A. Murphy, D.V.M., Ph.D.

Laboratory Diagnosis of Infectious Diseases is a major reference designed to link laboratory methods with clinical practice and epidemiological testing. It will be an essential tool for microbiologists and clinical specialists in infectious diseases. The volumes begin with an extensive discussion of methodological principles and practice. Then, each chapter is devoted to a particular disease and includes a description of the disease, epidemiologic aspects, etiologic agents, and therapy, prevention, and control measures. The editors have enlisted the participation of the best-known scientists throughout the world to cover all infectious diseases of international importance.

**Vol #1/1988/1101 pp./218 illus./Cloth \$180.00/
ISBN 0-387-96755-9**

**Vol #2/1988/961 pp./191 illus./Cloth \$140.00/
ISBN 0-387-96756-7**

Concepts in Viral Pathogenesis II

Edited by: **Abner Louis Notkins**, National Institute of Dental Research, National Institutes of Health, Bethesda, MD; and **Michael B.A. Oldstone**, Department of Immunopathology, Scripps Clinic and Research Foundation, La Jolla, CA

"The chapters are of unusual quality and consistency and have been written by recognized authorities all working on the cutting edge of virology . . . Provides very interesting reading." — ASM News

The very latest information on viral pathogenesis is presented here in an easy-to-read and highly accessible format. Noted authorities contribute concise "mini-reviews" of key topics, stressing major concepts, mechanisms, unresolved problems, and future directions. The reviews are systematically arranged so that earlier chapters lay the groundwork for those that follow. This book makes it easy for the busy researcher or clinician to become familiar with one of the most important topics in contemporary research.

1986/425 pp./31 figs./Cloth \$45.00/ISBN 0-387-96322-7



Springer-Verlag

New York Berlin Heidelberg Vienna
London Paris Tokyo

Advances in Disease Vector Research Vol. 5

Series Editor: **Kerry F. Harris**

Novel syntheses of current thinking and exploration of likely future trends fuels this unique series, providing the most current, world-wide coverage of vector-borne pathogens affecting human, animal, and plant health. Its primary focus is the emerging science of transmission ecology, studying biotic and abiotic environmental components, pathogen-vector-host compatibility, and vector transmission efficiency.

**1988/300 pp./40 figs./Cloth \$89.00
ISBN 0-387-96738-9**

Sexually Transmitted Diseases

Edited by: **Lawrence Charles Parish** and **Friedrich Gschnait**

A concise manual that outlines the important aspects of sexually transmitted diseases as encountered by the practicing physician. Provides clear, concise diagnostic descriptions and practical suggestions for treatment.

**1988/388 pp./145 figs./Cloth \$80.00
ISBN 0-387-96776-1**

Orthopedic Infection

Edited by: **David Schlossberg**

The definitive reference for physicians who treat bone and joint infections. Its clinically-oriented chapters discuss osteomyelitis; disc space infection; arthritis; bursitis and tendonitis; radiologic diagnosis; infection of orthopedic prostheses; prophylaxis in orthopedic surgery; and antibiotic pharmacokinetics.

**1988/182 pp./37 figs./Cloth \$79.00/ISBN 0-387-96719-2
(Clinical Topics in Infectious Diseases)**

Parasitic Diseases Second Edition

By: **Michael Katz**, **Dickson D. Despommier**, and **Robert W. Gwadz**

New edition — completely revised and updated. "The best book on medical parasitology for practitioners which we have seen . . ." — Pediatric Infectious Diseases (on the first edition)

**1988/301 pp./350 figs./Cloth \$49.00/
ISBN 0-387-96800-8**

Call our toll-free number to charge your order: 1-800-SPRINGER (in NJ please call 201-348-4033). Or send payment plus \$2.50 postage and handling (NY, NJ, and CA residents please add sales tax) to: Springer-Verlag New York, Inc., Attn: D. Kandilakis, 175 5th Avenue, New York, NY 10010

Calcium in Muscle Activation

1st edition 1986. Corrected 2nd printing 1988.
97 figures. XIV, 300 pages. Softcover DM 79,—.
ISBN 3-540-18278-0

(Originally published as Volume 19 of the Series Zoophysiology)

One year after the appearance of the hardcover edition the text was revised and updated with approximately 1500 keywords in the index and more than 900 references.

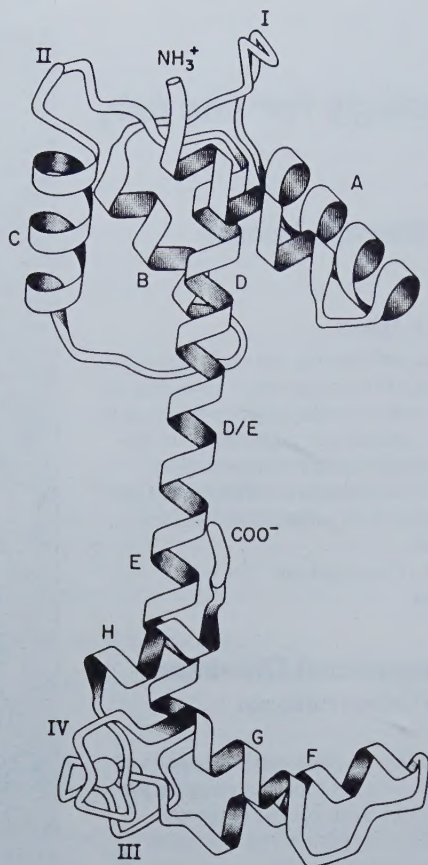
Calcium in Muscle Activation presents a concise yet comprehensive overview of the control of calcium movements and calcium action in smooth, cardiac, and skeletal muscle. This textbook describes our current knowledge regarding calcium handling in muscle cells, the molecular mechanisms that underlie the activation of contractile proteins, and how these basic processes have been adapted in various kinds of muscles. This book is designed for graduate students studying muscle physiology and biophysics. In addition, it will also be of interest to comparative physiologists, cell biologists, pharmacologists, and clinicians, particularly those in the cardiovascular field.

From the reviews:

"... This book focuses on the excitation-contraction coupling process in a variety of muscles with Ca^{2+} as the key element. ... Throughout the book the principles of diversity and unity are emphasized ...

Rüegg leads the reader through a large amount of material in historical perspective but covers important current topics in sufficient detail to initiate newcomers to the active research areas as well as providing those who are already working in this field with useful surveys of present and future trends. ... The last two chapters provide an interesting framework for the integration of the wealth of data presented in the book ... [which] contains many excellent diagrams and tables, useful chapter summaries, an extensive bibliography and a well-organized index. The price of the book [hardcover] may keep it out of the hands of students and younger investigators. A paperback edition would remedy this problem."

The Quarterly Review of Biology



Springer-Verlag
Berlin Heidelberg New York
London Paris Tokyo
Hong Kong

Heidelberger Platz 3, D-1000 Berlin 33 · 175 Fifth Ave.,
New York, NY 10010, USA · Springer House, 8, Alexandra
Rd., Wimbledon London SW19 7JZ, England · 26, rue des
Carmes, F-75005 Paris 37-3, Hongo 3-chome, Bunkyo-ku,
Tokyo 113, Japan · Citicorp Centre, Room 1603, 18
Whitfield Road, Causeway Bay, Hong Kong

Springer